



Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775
Tel 225-381-4177

Joseph A. Clark
Manager, Regulatory Assurance

December 17, 2013

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

RBG-47417

SUBJECT: Supplement to Request for Alternative in Accordance with 10 CFR 50.55a(a)(3)(i), Use of Boiling Water Reactor Vessel and Internals Project (BWRVIP) Guidelines in Lieu of Specific ASME Code Requirements
River Bend Station, Unit 1
Docket No. 50-458
License No. NPF-47

Reference 1 Entergy letter; Request for Alternative in Accordance with 10 CFR 50.55a(a)(3)(i) Use of Boiling Water Reactor Vessel and Internals Project (BWRVIP) Guidelines in Lieu of Specific ASME Code Requirements (RBG-47362), Dated May 16, 2013

2 NRC Email; River Bend Station, Unit 1, Request for Additional Information Regarding Relief Request RBS-ISI-019 (TAC No. MF1867), Dated November 14, 2013

On May 16, 2013, Entergy Operations, Inc (Entergy) requested an alternative to specific portions of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Reference 1.

On November 14, 2013, the NRC Staff requested additional information regarding this request. The Attachment to this letter contains the requested information.

This letter contains no new regulatory commitments.

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If you have any questions regarding this request or require additional information, please contact me.

Respectfully,

Kristi Huffstaller
JAC/bmb for Joseph A. Clark

Attachments:

Attachment 1 – RAI Responses

RBFI-13-0155

cc: U.S. Nuclear Regulatory Commission
Region IV
1600 E. Lamar Blvd.
Arlington, TX 76011-4511

NRC Resident Inspector
PO Box 1050
St. Francisville, LA 70775

Central Records Clerk
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

Mr. Alan Wang, Project Manager
U.S. Nuclear Regulatory Commission
MS O-8B1
11555 Rockville Pike
Rockville, MD 20852-2738

Attachment 1

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RAI Responses

RAI Responses

(1) RAI-1-The NRC staff requests that the licensee identify whether there are any furnace-sensitized stainless steel vessel attachment welds associated with the RVI components at RBS. It is requested that the licensee provide an explanation regarding the type of inspection program and any additional augmented inspection program that are implemented for any existing furnace-sensitized stainless steel attachment welds at RBS.

Response:

There are furnace-sensitized stainless steel vessel attachment welds associated with the RVI components at River Bend Station. The Jet Pump Riser Brace and Steam Dryer Hold Down Bracket attachment welds are furnace sensitized. The inspection strategy for internal attachments is found in Section 3 of BWRVIP-48-A and there are no additional augmented inspections performed on the interior attachment welds beyond that specified in BWRVIP-48-A.

(2) RAI-2- Since the following BWRVIP reports are used by the BWR licensees, the NRC staff requests that Entergy should either include or provide an explanation for not including the following BWRVIP reports in Section 5.0 of its submittal dated May 16, 2013.

BWRVIP-138, "BWRVIP Updated Jet Pump Beam Inspection and Flaw Evaluation."

BWRVIP-139, "BWR Vessel Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines."

BWRVIP-183, "BWR Vessel Internals Project, Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines."

Response:

BWRVIP-138, which provides an inspection strategy for jet pump beams, was not included in Section 5.0 of the submittal because inspection of the jet pump beams is not required under ASME Section XI. River Bend does however; follow the requirements of the latest version of BWRVIP-138.

BWRVIP-139, which defines the inspection requirement for steam dryer assemblies, was not included in Section 5.0 of the submittal because inspection of the steam dryer assemblies is not required under ASME Section XI. River Bend does however; follow the requirements of the latest version of BWRVIP-139.

BWRVIP-183 was not initially included since it has not been approved by the NRC. In letter RBG-47395 dated 10/2/2013 to the NRC, River Bend committed to perform this inspection in RF-18 (Spring 2015) per BWRVIP-183. As a result Entergy requests BWRVIP-183 be included in this request.

(3) RAI-3- The NRC staff requests that the licensee confirm whether NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking", will be used for the inspection of feedwater sparger tee welds and feedwater sparger piping brackets.

Response:

Currently there are no existing BWRVIP Inspection and Evaluation guidelines regarding the feedwater spargers. BWRVIP-48-A governs inspection of the reactor vessel internal attachment welds, namely, the feedwater sparger brackets. River Bend performs visual inspection in accordance with NUREG-0619 on the feedwater sparger piping, spacer brackets, pins, end brackets, flow holes and sparger tee welds. There are no ASME Section XI inspections required of the feedwater spargers other than the inspections of the bracket attachment welds to the vessel.

(4) RAI-4- According to Section 2.0 of the BWRVIP-76 report, core shroud welds shall be inspected every 6 years when the enhanced visual test (EVT-1) method is used for one-sided weld inspections, and shall be inspected every 10 years when the subject welds are examined with the ultrasonic test (UT) method. The inspection frequency for the core shroud welds (H1 through H7) as indicated in Table 1 of Attachment 1 of the submittal dated May 16, 2013, is not consistent with the aforementioned requirement. Therefore, the NRC staff requests that the licensee revise the inspection frequency requirement for the subject welds in Table 1 of Attachment 1 of the May 16, 2013, submittal.

Response:

River Bend is a Category B plant and inspects the H3, H4, H6A and H7 welds as required by BWRVIP-76. River Bend performed ultrasonic inspections of the required welds per BWRVIP-76 and its predecessor documents in RF-7 (1997), RF-12 (2004), RF-14 (2008) and RF-16 (2011) as shown in Table 1 of Attachment 3 of the submittal dated May 16, 2013.

(5) RAI-5- Since 182 welds are more prone to inter-granular stress corrosion cracking (IGSCC) than 308/316 welds, the NRC staff requests that the licensee provide information how the aging management program (AMP) is effectively implemented in identifying the extent of aging degradation in these welds in a timely manner.

Response

With regard to Examination Category B-N-1, there are no Alloy 182 welds. With regards to Examination Category B-N-2, the following locations have Alloy 182:

1. Guide Rod Bracket
2. Steam Dryer Support Bracket
3. Core Spray Bracket
4. Feedwater Sparger Bracket
5. Shroud Support (weld H9)
6. Shroud Support Legs (weld H12)

The guide rod bracket, steam dryer support bracket, core spray bracket and feedwater bracket inspections are specified in BWRVIP-48-A and the shroud support and shroud

support legs inspections are specified in BWRVIP-38. It is noted in BWRVIP-48-A that brackets with Alloy 182 attachment welds would be most susceptible to stress corrosion cracking. No additional augmented inspections are performed on the Alloy 182 welds outside of that defined in BWRVIP-48-A and BWRVIP-38. No cracking has been identified in the Alloy 182 welds at River Bend.

(6) RAI-6-The NRC Staff reviewed the previous inspection results for the various RVI components that are addressed in the Attachment 3 of the licensee's May 16, 2013, submittal and determined that additional information is required on the extent of aging degradation in the most susceptible areas of the weld connections in the RVI components as follows:

Top Guide-

RAI-6-1: Section 8.1 in BWRVIP-183 states that top guide cells are prone to irradiation assisted stress corrosion cracking (IASCC) when they are exposed to a neutron fluence value greater than 5×10^{20} n/cm². If the top guide cells at RBS are exposed to a fluence value greater than this threshold limit during the fourth ISI interval, consistent with guidelines addressed in Section 8.1.2 of BWRVIP-183, inspections of the rim areas containing the welds and heat affected zone should be performed every 6 years. Confirm that such inspections will be performed.

Core Spray and Core Spray Spargers-

RAI-6-2: During the refueling outages from 2008-2013, a total of 54 welds were inspected and no indications were found. With respect to the examinations of these welds, the staff requests that the licensee provide the following information: (1) the number of these welds that have Type 304 stainless steel material with a creviced weld geometry, (2) the number of these welds that have Type 304L stainless steel material with a creviced weld geometry, and, (3) the approximate area of inspection coverage.

LPCI Coupling-

RAI-6-3: During the refueling outages from 2004-2013, a total of 24 welds were inspected and no indications were found. With respect to the examinations of these welds, the staff requests that the licensee provide the following information: (1) the number of these welds that have Type 304 stainless steel material with a creviced weld geometry, (2) the number of these welds that have Type 304L stainless steel material with a creviced weld geometry, (3) the approximate area of inspection coverage and, (4) the number of Alloy 182 welds in the inspected population.

RAI-6-4: Provide information for the number of Alloy 182 welds that have been inspected during past outages in the following RVI components and the approximate area of inspection coverage.

(a) jet pumps; (b) in-core dry tubes; and (c) CRD housings

Core shroud-

RAI-6-5: The licensee identified nine percent of weld flaws in core shroud circumferential weld H4 during the 2008 refueling outage inspections. Provide a brief summary of the supporting analyses showing how these findings were dispositioned in the licensee's Corrective Action Program.

Response:

6-1: In letter RBG-47395 dated 10/2/2013 to the NRC, River Bend discussed that the Top Guide had not been inspected to date per BWRVIP-183 and attached to this letter is a commitment from the site to perform this inspection in RF-18 (Spring 2015).

6-2: River Bend does follow BWRVIP-18 for inspection of Core Spray, however; this question is outside of the scope of this Relief Request because the Core Spray piping and sparger welds are not required inspections under ASME Section XI Table IWB-2500-1.

6-3: River Bend does follow BWRVIP-42 for inspection of the LPCI Couplings, however; this question is outside of the scope of this Relief Request because the LPCI Couplings are not required inspections under ASME Section XI Table IWB-2500-1.

6-4: River Bend does follow BWRVIP-41 for inspection of the Jet Pumps, SIL 409 Revision 3 for inspection of the in-core dry tubes, and BWRVIP-47 for inspections of the CRD housings. However, this question is outside of the scope of this Relief Request because these components are not required inspections under ASME Section XI Table IWB-2500-1.

6-5: In 2008, 92.7% of the H4 was inspected and total of 9.0% of the weld was found to be flawed. The resulting CR stated that the River Bend shroud remained a Category B shroud with no scope expansion to the vertical welds and a reinspection frequency of 10 years. In addition, a plant specific evaluation was performed to confirm the reinspection intervals on the H3, H4, H6A and H7 welds. The plant specific evaluation confirmed that a 10 year reinspection interval is acceptable for the H4 weld and the next inspection is scheduled for RF-19 (2017).

(7) RAI-7-To assess the effectiveness of RBS's implementation of hydrogen water chemistry (HWC) or HWC in conjunction with noble metal chemical addition (NMCA), the staff requests that the licensee provide the following information:

- (1) Measurement of electrochemical potential (ECP) of stainless steel material that represents a typical RVI component. ECP measurement should be made when HWC or HWC and NMCA method is used.
- (2) Measurement of the amount of platinum deposit on a stainless coupon if HWC and NMCA method is used.

Response:

(1) The current cycle to date average electrochemical potential is -452.8 mV(SHE) with a minimum of -474 mV(SHE) and a maximum of -428 mV(SHE).

(2) Following the May 2010 Online NobleChem Application at River Bend, an oxidized stainless steel coupon was removed and analyzed for platinum loading. The analysis for the coupon resulted in a platinum loading of 0.02 $\mu\text{g}/\text{cm}^2$. No additional coupons have been pulled.